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Original Article

Cardiopulmonary resuscitation: Knowledge and personal experience among dentists in Udaipur, India

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Abstract *Background/purpose:* The present study was undertaken to assess the knowledge and personal experience with cardiopulmonary resuscitation (CPR) among dentists in Udaipur, India.
Material and methods: In a cross-sectional study, 241 dentists (113 males and 128 females) consisting 190 faculty dental practitioners of two colleges along with 51 local dental practitioners were surveyed using a self-administered, structured questionnaire pre-tested through a pilot survey. The frequency, percentage of distribution, and mean rank were calculated. Kruskal—Wallis and Wilcoxon signed-rank nonparametric tests were used to test for significance.
Results: In this study, 75.9% of dentists had received information about basic CPR but only 56.0% had the correct concept of performing it, and only 12% had received practical training in basic CPR. One in ten dentists had seen patients suffering from cardiopulmonary arrest (CPA) in their practice, but none of them mentioned any fatality because of CPA. The level of knowledge was significantly higher among faculty dental practitioners (126.61) compared with local dental practitioners (100.10). In addition, a positive linear correlation was found between educational level and knowledge level ($r = 0.307$, $P = 0.01$).
Conclusions: As only a few dentists (12%) had undergone training in CPR, there is a perceived need for training among dentists in its management.

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Introduction

Cardiac diseases are some of the most prevalent diseases worldwide, and India as a developing country is seriously affected by these systemic diseases because of changing lifestyles and food habits. Understanding sudden cardiac death as a public health problem has paralleled the development of modern emergency medical service systems.[1] According to the World Health Organization, cardiovascular disease causes 12 million deaths in the world each year,[2] whereas in India, 27% of deaths are because of cardiovascular diseases.[3]

Cardiopulmonary arrest (CPA) is the sudden cessation of respiratory movement or effective circulation and is one of the most common emergencies. Consequently, diagnosis must be done as soon as possible.[4] The tolerance of the heart to anoxia is high, and the central nervous system will show irreversible lesions if anoxia lasts for more than 3—4 minutes.[5]

Little information has been published on the competence of dentists to resuscitate patients suffering from CPA.[6] Considering the seriousness of the situation, training in the management of cardiac arrest is considered an essential component among dental professionals, with recommendation for annual training in cardiopulmonary resuscitation (CPR).[7] All members of a dental team must be trained and prepared to administer CPR, and there should be frequent practice of resuscitation routines.[8] CPR (the kiss of life) is unlikely to restart the heart, but rather its purpose is to maintain a flow of oxygenated blood to the brain and heart, thereby delaying tissue death and extending the brief window of opportunity for successful resuscitation without permanent brain damage.[9] Besides training in basic techniques of resuscitation such as mouth-to-mouth respiration and chest compression, other procedures can also be useful, such as the use of a laryngoscope, an oropharyngeal tube, an Ambu mask, an oxygen balloon, and drugs such as adrenaline.[4]

Dentists with patient contact obviously need to maintain competence in resuscitation throughout their careers. Although resuscitation emergencies are distinctly uncommon in dental surgery, dentists should be able to apply appropriate basic life-support resuscitation skills if required.[10]

Thus, this study was done to determine how prepared dentists considered themselves to be to manage CPA and their knowledge of CPR.

Materials and methods

This cross-sectional study was conducted in December 2008 to determine the knowledge and personal experience among dentists regarding CPR. The study was conducted among dentists in Udaipur City, Rajasthan, India.

Study population

Before beginning the study, information on the total number of dentists in two colleges was obtained from the colleges, and a list of private practitioners was obtained from the Udaipur branch of the Indian Dental Association. The total number of dentists in the city was 405, of which 330 were faculty dental practitioners in two dental institutes (Pacific Dental College and Darshan Dental College), and 75 were local dental practitioners.

All dentists available during the study period were included in the study. So a total of 260 dentists were available at the time of the survey, of whom only 250 agreed to participate and nine copies of proformas were excluded because of incomplete responses. So, a total of 241 dentists (113 males and 128 females), consisting of 190 faculty dental practitioners (including oral and maxillofacial surgeons) and 51 local dental practitioners, participated in the survey.

Ethical clearance and official permission

Before commencement of the survey, ethical approval was obtained from the Ethical Committee, and official permission was received from the principals of both colleges. Written informed consent was obtained from all those who were willing to participate in the survey.

Pre-testing of the questionnaire

Before data collection, a pilot survey was conducted among 20 dentists to assess the appropriateness of the questionnaire, and it was found that the questions were unambiguous and easy to respond.

Questionnaire

A self-administered, structured questionnaire written in English and validated through a pilot survey including nine dichotomous questions was used to evaluate the knowledge and personal experiences with CPR among all participants.

Methodology

Dentists were visited by a single investigator, and all available and willing participants were given the questionnaire on the day of the visit. Participants were asked to respond to each item according to the response format provided with the questionnaire.

Data analysis

For data analysis, each correct answer was given a score of '1' and each wrong answer was given a score of '0'. Individual scores were summed up to yield a total score. Data were analyzed using SPSS vers. 13 (SPSS, Chicago, IL, USA). Frequency and percentage distributions were calculated. Kruskal—Wallis and Wilcoxon signed-rank nonparametric tests were used to test the significance and Spearman's correlation coefficient was applied to compute knowledge and educational levels. Statistical significance for all tests was accepted at $P < 0.05$.

Results

The distribution of dentists according to type of practitioner and gender is given in Table 1. Table 2 shows that

Table 1 Sample description by the type of practitioner and gender.

Characteristics	*N*	Percentage (%)
Male	113	46.9
Female	128	53.1
Faculty dental practitioners	190	78.9
Local dental practitioners	51	21.1

Table 2 Questions for assessing knowledge and personal experience with cardiopulmonary resuscitation.

Questions	Dentist's response (%)	
	Yes	No
Do you know what is a cardiopulmonary arrest?	84.6	15.4
Have you ever received information about basic cardiopulmonary resuscitation?	75.9	24.1
Are you aware of the conditions where you need to perform basic **CPR**?	57.3	42.7
Do you know the correct concept of performing basic **CPR**?	56.0	44.0
Have you ever seen patient suffering from **CPA** in your practice?	10.4	89.6
Have you ever come across any causality due to **CPA** in your dental practice while doing any dental treatment?	0.00	100
Do you take medical history before treating any the patient?	81.3	18.7
Have you ever undergone any training of basic **CPR**?	12.0	88.0
If a **CDE** program on advance **CPR** is conducted are you interested to attend?	91.7	8.3

84.6% dentists considered that they knew what CPA is, but only 56% correctly answered questions about the concept of CPA. More than half of the dentists (57.3%) considered that they were able to perform basic CPR. Although 75.9% had received information about basic CPR, only 12% had received practical CPR training. Few participants (10.4%) had personally observed a patient suffering from CPA in their dental practice, but no patient had died because of CPA. Before doing any treatment, 81.3% of dentists take a medical history. When it comes to attending continuing dental education programs on CPR, 91.7% of dentists showed a positive response.

Table 4 Shows differences among dentists in knowledge and personal experience with CPR.

Characteristics	*Z*	P
Sex	−13.399	0.00*
Dental practitioners	−13.510	0.00*

Test used: Wilcoxon signed-rank test; *P $<$ 0.05.

Table 3 gives the mean rank scores according to gender. A significant gender difference was observed in the knowledge and personal experience scores, with females having a lower mean rank score compared with males (P = 0.001). However regarding the type of practice, it was found that faculty dental practitioners had a significantly higher level of knowledge and personal experience than local dental practitioners (P = 0.012). Table 4 shows significant differences among dentists in knowledge and personal experience with CPR. Among all dentists, we found a positive linear correlation between educational level and knowledge level (Spearman's rho correlation, r = 0.307, P = 0.01) (Table 5).

Discussion

CPA can be a major cause of emergencies in dental clinics. Deaths were reported because of CPA in dental practice.[11] Lack of training and an inability to deal with these emergencies can lead to tragic consequences with legal ramifications.[12]

In the present study, 75.9% had received information on CPR compared with 86% found in a study by Heron Fernando et al.[4] Theoretical information with demonstrations, but without practice, is probably insufficient to ensure CPR competence. Comparing the present data with the literature, it was observed that 56% of dentists had the correct concept of performing CPR compared with 37% in Kavari's study.[12] In terms of their declaration that they were capable of performing CPR, the present study showed similar results with an average of >50% compared with other studies.[6–12] CPR techniques must be taught and emphasized for health professionals in developing countries such as India. In developed countries, with a higher level of education, this probably could be extended to most of the population.[6] In the present study, it was shown that >90% of professionals were interested in attending continuing dental education programs on managing CPA, which was quite similar to a study by Atherton.[7] The present study found that only 12% of dentists had undergone training in

Table 3 The mean rank scores of knowledge and personal experience with CPR according to gender and type of practitioner.

Characteristics		*N*	Mean rank	Chi-square	P
Gender	Male	113	135.75	10.274	0.001[a]
	Female	128	107.98		
Type of practitioners	Faculty dental practitioners	191	126.61	6.275	0.012[a]
	Local dental practitioners	51	100.10		

Test used: Kruskal–Wallis test.
[a] significant.

Table 5 Spearman's correlation coefficients (ρ) between educational level and knowledge level.

	N	Educational level	Knowledge level	P
Correlation coefficient	241	1.00	0.307	0.01

CPR compared with 61.5% in Chapman's study; ideally this result should be much higher.[10]

In relation to having actual experience with cardiac arrest in the dental clinic, the present study reported that 10% of interviewed dentists had experienced it, in contrast to 4% in a study by Kavari.[12] In fact, in some studies there were some fatalities because of CPA in the dental office[12] but no death was reported in the present study. The present survey is extremely relevant, and it emphasizes the importance of CPR among dentists and a need for improvements in knowledge and personal skills in its management.[4]

In the present study, when knowledge and personal experience with CPR were assessed by gender and type of practice, males had a significantly higher mean rank score than females. Similarly, faculty dental practitioners had a higher mean rank score than local dental practitioners. The reason behind these results could be that males devote more time to their profession as females are more involved to their household activities, and faculty dental practitioners have more opportunities to treat special cases and access training for CPR.

Conclusions

As only a few dentists had undergone training for CPR, there is a need for improved training, so educational institutions have to improve the training of dentists for CPR and other medical emergencies that can occur in the dental office. Indian dentistry has reached a high level of qualification in various specialties of dentistry. A better knowledge of medical emergencies is a necessary step for the further development of dentistry in India, and to provide better and safer service for the population.

Recommendations

Dental practitioners should be competent in CPR both as professionals and as members of society. Every effort should be made to publicize CPR training and educate dentists about its importance. Hence it is recommended that CPR training be included in the curriculum of all medical universities and must be taught to all health professionals in developing countries such as India.

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